

Interactive comment on “Characterization of ions at Alpine waterfalls” by P. Kolarž et al.

Anonymous Referee #2

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General Comments

Manuscript presents inventive experiments and interesting ion data measured nearby waterfalls in the Austrian Alps. However, the authors could go more in detail with their data (i.e. temporal variation of ion concentrations and ratios), and add some more discussion related to motivation of their work, measurements and conclusions. After considering following comments, I recommend publishing this manuscript in the Atmospheric Chemistry and Physics.

Specific Comments

1. Please discuss the motivation of your work, i.e. why did you characterise waterfall generated ions. I think it is good to indicate some of the main research aims already in the abstract (p. 25298) and continue more in detail in the introduction.

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2. Currently introduction discusses air ions in general (p. 25298-25299) and possible formation pathways of waterfall generated ions (p.25299-25300). I recommend compressing the first part to give only relevant background information, and extending the discussion of the later topic, which is more essential for this manuscript.

3. Throughout the manuscript, please pay attention that you are consistent with names of charged particles (i.e. waterfall generated/natural small ions (< 2 nm in diameter) and charged particles (> 2 nm in diameter)) and size ranges (i.e. smaller than 2 nm or narrow size range around 2 nm). In this manuscript detailed size classification is unnecessary and may be confusing (p. 25299, l. 10-14).

4. As I understand, the authors have assumed that all air ions (natural and waterfall generated) are singly charged (p. 25299, l. 14-16). This assumption holds for ions small enough. However, with increasing size multiple charges should be included in the mobility diameter conversion. Unfortunately, the charge distribution as a function size for waterfall generated ions is unknown. This is especially a problem when analysing and discussing SMPS size distribution data. This should be considered when finalising the manuscript.

5. p. 25300, l. 17. To make manuscript more fluent, please describe more in detail all measurement sites and measurement periods at each site.

6. p. 25303, l. 5-9: If possible show some more detailed analysis based on your data.

7. The conclusions should be extended to show the importance of the results (p. 25309): I would appreciate if discussion of connection between results and research aims would be included.

Technical Comments

1. p. 25298, l.11-12: I think it is unnecessary to separate section 1.1 if there is no section 1.2.

2. p. 25300, l. 3: Reaction equation should be better connected to text.

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3. p. 25300, l. 11-12: Sentence starting by Laakso et al. may be moved immediately after the previous sentence.

4. Make sure that text and figure caption agree on p. 25305, l. 6-7 and on p. 25318.

5. p. 25313, Fig. 1. This figure is modified from Zlich et al., 2008, and to my opinion it is unnecessary in this manuscript.

Interactive comment on *Atmos. Chem. Phys. Discuss.*, 11, 25297, 2011.

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